Extended Producer Responsibility
Consumer Electronic Products

Background (to be written)

- ESHB 2488 history and content
- Past efforts nationally
  - NEPSI, WEPSI,
- Other states
  - Maine, California, Maryland, other states
- Local Governments

The Washington State Legislature directed the Department of Ecology to conduct research and develop recommendations for implementing and financing an electronic product collection, recycling, and reuse program for the state. The rationale for this directive included these legislative findings:

- Rapidly changing technological advances in the computer and electronics sector have resulted in an increasing number of outdated electronic products.
- The Environmental Protection Agency estimates that over 20 million personal computers became obsolete in 1998 and only 13 percent were reused or recycled.
- By 2005, more than 63 million personal computers are projected to be retired according to a recent study by the National Safety Council.
- Electronic products may contain hazardous materials including lead, mercury, brominated flame retardants, and hexavalent chromium.
- Cathode ray tubes in computer monitors and video display devices may contain between four to eight pounds of lead.
- National and state efforts have been initiated to examine opportunities to recycle and reuse electronic waste and encourage development of products using less toxic substances and more recycled content.

By directing the Ecology to develop recommendations for implementing and financing an electronic product collection, recycling, and reuse program for the state, the legislature made a determination that the issue of recycling electronic products is a matter of state concern. This is supported by other state laws. The State Environmental Policy Act Chapter 43.21C RCW established that it is the responsibility of the state of Washington to improve and coordinate programs and resources so that its citizens can, among other things, “enhance the quality of renewable resources and approach the maximum attainable recycling of depletable

resources."[i] In the Solid Waste Management – Recovery and Recycling Act Chapter 70.95 RCW the legislature established that "recycling, with source separation of recyclable materials as the preferred method" of solid waste handling, second only to waste reduction.[ii]

In addition, the State Economic Policy, Chapter 43.21H RCW, states that in developing rules governmental entities of the state are to **"**insure that economic values are given appropriate consideration …along with environmental, social, health, and safety considerations."[iii] While applicable only to rule-making, we could consider the intent of this policy here.

Given these policies have been established, and the direction given by the legislature related to this project, it would seem that the role of government in establishing policy related to recovery and recycling of end of life electronic products, should be to find the least cost alternative for the citizens of the state that results in the maximum amount of end of life product being recovered.

In carrying out the evaluations of programs the legislature directed Ecology to consider:

- Urban versus rural recycling challenges and issues;
- The involvement of covered electronic product manufacturers;
- Different methods of financing the collection, reuse, and recycling programs for covered electronic products;
- The impact of the approach on local governments, nonprofit organizations, waste haulers, and other stakeholders;
- How to address historic and orphan waste; and
- The effect of landfill bans on collection and recovery of covered electronic products.

In order to carry out the evaluations the legislature required Ecology to:

- Examine existing programs and infrastructure for reuse and recycling of electronic waste;
- Compile information on electronic product manufacturers' covered electronic product collection, recycling, and reuse programs;
- Review existing data on the costs to collect, transport, and recycle electronic waste;
- Develop possible performance measures to assess the effectiveness of collection, reuse, and recycling of covered electronic products;
- Develop a description of what could be accomplished voluntarily and what would require regulation or legislation if needed to implement the recommended statewide collection, recycling, and reuse program for covered electronic products;
- Research the potential impacts of recycling or reusing electronic waste on jobs, recycling, infrastructure, and economic development;
- Evaluate the suitability of lined and unlined facilities for the disposal of covered electronic products;
- Explore state financial incentives for developing business opportunities and jobs in the area of covered electronic product recycling and reuse infrastructure;
- Develop and assessing ways to establish and finance a statewide collection, reuse, and recycling program for covered electronic products;
- Work with the federal environmental protection agency, other federal agencies, and interested stakeholders to:
    - Determine the amount of electronic waste exported from Washington that is subject to reporting under 40 C.F.R. part 262;

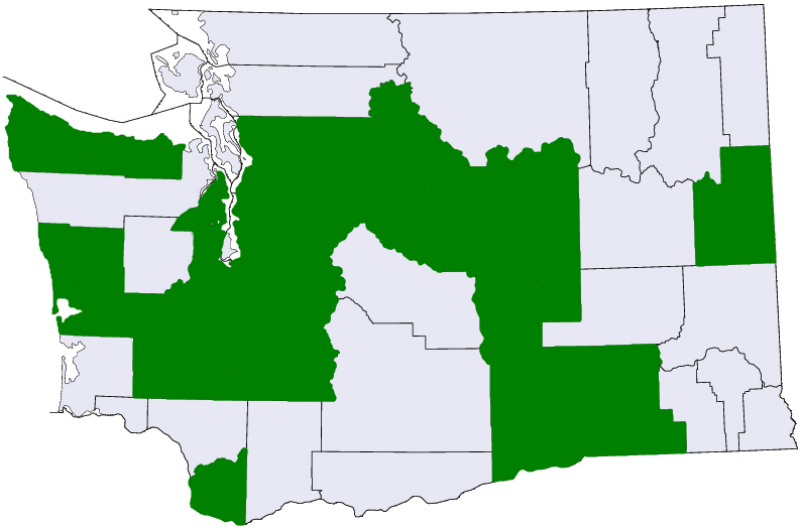
    - Determine the amount of electronic waste exported from Washington that is not subject to reporting under 40 C.F.R. part 262, including electronic waste from households, small quantity generators, regulated generators, and other sources; and
    - Identify methods to determine if exports of electronic waste from Washington are in compliance with national laws in destination countries;

- Examine the need for and develop recommendations to address electronic waste collection, reuse, and recycling services, and financing options for charities, school districts, government agencies, and small businesses; and
- Give special consideration to costs incurred by charitable organizations receiving unwanted electronic products and possible pilot projects and other waste collection systems that could be developed to address these products and costs related to disposal.

EVALUATING NEW AND EXISTING PROJECTS

In our process, existing projects were evaluated from a list of notable programs identified by stakeholders and the Northwest Product Stewardship Council library. The programs evaluated represented a good, diversified sample.

A total of 44 programs were chosen representing local, state, national and international geographic areas. We evaluated three from foreign countries, five from throughout the United States, fourteen in other states, and 22 in Washington. Selected Washington programs are located in 16 counties[1], highlighted in green in the following figure.



Location of Chosen Projects in Washington Counties
Collection point(s) are located in the selected county,
but not necessarily serving the whole county

Once the programs were identified, the information was categorized into four types: general, collection, recycling, and financing. Programs are presented side by side within each category, in spreadsheet format, for ease of comparison (see database).

We did not receive the cooperation from industry run programs that we thought we might. Manufacturers considered information about their programs proprietary.

Recycling information describes the steps taken after all equipment was collected. It states whether the materials was reused, smelted, remanufactured, or exported overseas. It also identifies the collectors, dismantlers, consolidators, and recyclers to whom materials are subsequently shipped. Tracking the final destination is nearly impossible after the equipment is dismantled and the consolidated materials are sent to different markets. For various reasons related to market competition, many consolidators and recyclers would not release the names of their subcontractors, vendors, and brokers.

[1] Benton, Chelan, Clallam, Clark, Douglas, Franklin, Grant, Grays Harbor, King, Kitsap, Lewis, Pierce, Snohomish, Spokane, Thurston, and Walla Walla counties.

Financing data relates to the project costs and funding strategies[2]. The budget typically consists of administration, advertising, collection, disposal, processing, and shipping costs. It becomes complicated as administrators have different ways of classifying and recording their costs. Some do not report their expenses at all[3]. Permanent programs may have in-kind support and expenses that need time to stabilize. Demonstration projects, which explore new relations and markets, may require more funding than normal. Generally, there are "gray areas"; a direct comparison of project costs is not recommended.

There are many programs in existence; they range from one-time to ongoing, and manufacturer run to government-based. While the list is not all-inclusive, it does provide an adequate picture of current programs and infrastructure for collecting, transporting and processing electronic products for reuse and recycling.

Analysis and Evaluation

To the consumer, what to do with unwanted electronic products is generally a mystery. When replacing an electronic product due to obsolescence, the consumer generally keeps the old unit around. After all, it still works. It cost a lot of money when it was new. The idea of "throwing it away" is somewhat repugnant to most people. These old units become the second or third computer or television in the house, used as the "game computer" or the "shop TV" or simply stored away in a basement or garage. In short, people do not know what to do with these products.

Programs that prove convenient to consumers are more likely to be successful in collecting unwanted electronic products. Convenience includes easy access, availability, flexibility and consistency.

Programs that provide consistent and ongoing services for collection of electronic products from the public are the most effective. One time and short-term "collection events" are less effective. The quantity of unwanted electronic products gathered at collection events is small compared to the total number of product units potentially available. In addition, most collection events only occur within urban centers, leaving rural communities out.

[2] Funding, subsidies, grants, or contributions from government, manufacturers, processors, retailers, haulers, associations, end-user, volunteers, or other sources.
[3] Some administrators, such as manufacturers, choose do not disclose their expenses. Others are undocumented.

Issue 1: Financing - Manufacturer Responsibility, Consumer Responsibility or General Government?

This issue has been the major stumbling block in national discussions, stalling progress toward establishing a national recycling solution for electronic products. The issue boils down to these two questions:

- Should manufacturers pay for the costs associated with end of life management of the products they produce and their associate impacts? Or,
- Can collecting and recycling end of life electronics be accomplished through a consumer responsibility model that places a blanket fee on all products, managed by a third party or governmental entity, which pays for all associated costs?

Manufacturer Responsibility

Manufacturer responsibility mandates that producers independently create and finance their own end-of-life programs for specific brand name products. Generally, a plan is written that describes the programs. The plan is submitted to a government agency for review and approval. The plans must assure that the manufacturer establishes and meets recovery targets. Ideally, costs of the program are rolled into overall product costs. With this approach, the consumer does not see a fee, either at the point of purchase or at end of life. They are assured that they can return their end of life product for recycling. Some companies in Europe have demanded individual responsibility[iv].

Benefits

Market driven and competitive – Programs that are managed most efficiently will reduce overall product cost to the consumer, providing a cost competitiveness factor in the marketplace.

Encourages design changes that improve the end of life value and recycle-ability of products. Knowing that products will be returned to them for end of life management will cause manufacturers to assure their products are designed to be efficiently handled and to minimize hazardous material content. European studies have shown that individual responsibility programs have created stronger feedback loops to product designers.

Creates direct accountability to the source – Individual responsibility requires each manufacturer to provide convenient collection and transportation of products for recycling of end of life electronics back to the manufacturer or their contracted processor.

Flexibility - The manufacturers can establish their own material collection and processing systems, contract the services out to another business or businesses or rely on existing infrastructure and services. This system also allows for the opportunity to utilize a reverse vending or reverse distribution model, which uses the product supply infrastructure to back haul end of life products in trucks that would normally run empty on their return runs.

Potentially reduces the number to steps in handling the product at end of life. If a manufacturer designs a collection and processing system that works efficiently, there should be a minimum number of steps between the consumer and the end of the recycling process. This should prove to be more cost effective and energy efficient. This will have the joint benefit of providing the least cost option and reduced energy consumption, an environmental benefit.

Easy for consumers to use - If designed in a way that the associated costs are incorporated into the cost of the product, consumers will be more likely to participate by bringing their end of life equipment to the recycling option offered. If the cost is identified as a separate fee as part of the requirements for purchasing, consumers are likely to look for products that don't state a fee yet provide the same service.

Drawbacks

Confusion - Consumer information may not be clear, leading to confusion as to what to do with end of life products. Individual manufacturer programs may vary significantly.

Minimal accountability to a regulatory authority – Because these types of programs are operated privately and competitively, businesses are not likely to share information about quantities of product returned or material actually recycled into new products, declaring that information proprietary.

Difficult to measure effectiveness – Without knowing the details of products returned, performance can not be measured. One way of addressing this is through waste composition studies or monitoring incoming wastes at disposal facilities to determine if electronic products are being discarded. However, that would still not demonstrate the recovery rate of the products as there would be no number disposed number against which to evaluate. Another alternative would be to assume that all available products would be collected for recycling then establish a level of responsibility for each manufacturer based on the brands returned.

Relies on self-reporting by manufacturers to measure effectiveness – If manufacturers were willing to provide information on recovery rates of their products, those reports may be questioned as to accuracy due to tampering and number manipulation. Such information is considered proprietary by most companies.

Externalized costs - In some cases, the manufacturer may only be responsible for their end of life products only after the product arrives at their receiving dock. This is a major downside in that consumers are not as likely to participate in a program where they have to pay for shipping and handling cost to transport their product back to the manufacturer.

Effective programs must include the costs of collection, transportation and processing of the products in order to maximize consumer participation and product recovery.

Potentially reduces the number of in state jobs associated with recycling – While one of this model's best attributes is that it encourages efficiency and competition, it could very well cut certain collectors and transporters out of the process in order to reduce costs. If that is the case then the work associated with those activities would be eliminated.

On the other hand, more jobs are created and economic activity occurs when materials are recycled rather than disposed.

Consumer/Government Responsibility

In consumer/government responsibility models, manufacturers have no responsibility. These models rely on retail business to collect what has become know as an "advanced recovery fee" from the consumer at the point of sale. The funds submitted to the government revenue

agency to fund the program the can be managed by a governmental entity or a contracted private non-profit. This third party is responsible for assuring that end-of-life management of products are taken care of responsibly, providing subsidies to collectors, transporters and processors to handle returned products.

Benefits

Minimizes involvement of manufacturers - For the manufacturers, this eliminates, or significantly reduces, their active involvement in end of life management of their products. This in turn reduces the cost of their products at retail. Fees are charged and collected as a separate cost at point of purchase.

Creates a pool of funds that is used to pay for collection, transportation and processing of products – Costs associated with handling end of life products are be covered. Businesses that provide collection, transportation or processing services are provided prompt payment for those services from the third party.

Built in performance measurement – In order to receive reimbursement of costs, businesses handling products at end of life are required to report quantities of products collected and maintain documentation for audits. These reports are the basis for cost reimbursement. These data would also provide a performance measure of the various alternatives employed for collection, transportation and processing covered products.

Flexible – Provides an opportunity for many parties to be involved in the collection, transportation and processing of products. This in turn stimulates creativity in approach and efficiency in system design in order to realize the maximum profit available.

Drawbacks

Externalizes (out sources) costs and responsibility to retailers, state government and consumers – By creating a consumer fee and a third party organization, manufacturers have no responsibility for end of life management of their products. While this approach reduces direct cost for the manufacturer, all other parties become involved and responsible for product end of life management:

- Retailers would be required to collect fees.
- Consumers would be required to pay fees at point of purchase, as they dispose of their old products and replace with new.
- Local governments, responsible for solid waste management in the state, will create new systems to manage these and future new products that are introduced, which will require additional revenue to operate.
- State government would collect a new fee, manage it and operate or contract out a new program.

Most costly to the consumer - This model does not encourage the most efficient collection, transportation and processing systems as there is no incentive to reduce overall systems costs. Retailers will need to be compensated for the service of fee collection. Costs and profits for each entity along the way, from collection to final recycling, will need to be paid. While each of these entities may find efficiencies within their individual company to improve their own company profitability, there is no incentive to improve efficiency within the overall system that will reduce costs to the consumer without regulatory controls, whether by

government or the third-party organization. These controls would add more costs to the system.

No incentive for improving product design for environmental performance at end of life – With no end of life involvement with their products, manufacturers will be less likely to design their products for ease of recycling or to minimize hazardous substance content.

Reliance on a third party manager adds cost – Creating a third party manager to oversee the accounts receivable and payable process, certify material handlers, and create and use an audit system will be costly. Adding bureaucracy, private or public, will only raise the cost of the program to the citizens of the state. This is not a least cost alternative.

Perception that the fee is a tax – In these types of programs, fees are established in legislation. They are collected at the point of retail sale the same as sales tax.

A static fee does not stimulate innovation to improve system efficiency – If a static fee is established, the system finances programs at a steady state. This provides no incentives to system operators to improve efficiency of the programs in order to reduce costs to consumers.

Financial Responsibility

Boiled down further, the issue of responsibility comes down to "who pays?" In reality, in all approaches, the consumer ultimately pays for disposal of end of life products, regardless of what the product is.

Currently, the burden is on those least able to pay - An associated issue arises in relation to end of life management costs; which consumer pays? Currently, a standard practice in the life of electronics is that they are often "handed down" to another person for use – whether a son or daughter, or donated. The recipient of the used equipment is generally of lower income and is the least able to pay for appropriate end of life management. Products are often abandoned, left with thrift or charity organizations or dumped illegally. This places an undue financial burden on government, society and its economy as a whole.

A method of financing end of life management of products that fairly places costs on those that are able to pay is needed.

When the manufacturer is responsible for financing, the manufacturer will work to create efficiencies in their systems in order to minimize costs. Reduced costs will either reflect lower product costs to the consumer or increased profit for the manufacturer. Private industry is in charge to create a competitive program within the marketplace.

Issue 1 RECOMMENDATION

Require Manufacturer Responsibility
Based on this review, it would be in the best interest of the citizens of Washington to require that manufacturers take responsibility for their brand products at end of life. If a retail company brands their own product for retail sale, that company is individually responsible for those products.

Encourage Collaborative Approaches Between Manufacturers
Overall costs will be reduced when more material is handled in through the same system. Individual programs will cost more as the volumes of material flow will be lower requiring fixed costs to be repaid from a smaller resource base. Duplication of facilities with high capacity and small flows does not make good financial sense and is not in the best interest of the citizens of the state. Individual manufacturers could collaborate with others to gain efficiencies of scale.

Build on Existing Infrastructure and Washington State Businesses
Manufacturers will rely on systems and service providers within the state in order to minimize increased costs associated with collecting, transporting and processing. In so doing, the manufacturers will need to provide support to the service providers in order to assure that end of life product handling and product design for the environment are compatible.

The systems will rely on existing infrastructure and businesses in the state to the extent practicable and will result in the most cost effective approach for the citizens of the state.

Requirements
Plans – Each manufacturer of televisions, personal computers and computer monitors that are sold in and into the state shall write and submit a plan to recover an equivalent share of their branded end of life products. The plan will demonstrate how the manufacturer will provide collection, transportation and processing of these products conveniently and at no additional cost to the consumer. The department will create plan requirements by rule and will update those rules from time to time in order to stay current with new technologies and new products introduced by manufacturers over time. Manufacturers should be able to write independent plans, write collaborative plans or join an organization that would write and implement plans on their behalf. Each manufacturer plan is fully funded by that manufacturer.

Accountability – In order to assure implementation of programs designed by manufacturers, a reporting mechanism is required. Quarterly reports should be submitted to Ecology that include the number of units, by type, recovered and weight of those units, by type and total; sources by county location in the state; and final disposition of processed goods including how much of the material was reused in the manufacturers products, how much was used to make other products (identifying what type of product) and where the material was sent for these uses.

Issue 2: Government Mandated Participation or Voluntary Programs

The efforts to collect, transport and process electronic products in place today are voluntary. We believe, based on the agency's recycling survey, that these programs do not effectively capture a significant quantity of end of life electronic products. It has been reported that most electronic product presently collected for recycling are received from business, industry and governments, which are not the primary target of ESHB 2488. The quantities of consumer electronic products collected have primarily been collected at short term collection events sponsored by partnerships between retailers, local governments and manufacturers.

While by themselves, the quantities collected at these events look impressive, on the greater scale of things, these quantities are small in comparison to that which is available.
Some manufacturers have set up voluntary take back programs that charge end-of-life fees ($20 to $30) to consumers for each unit returned. The consumer packages and pays for shipping. It appears that the participation in these programs has been relatively low. These voluntary programs are financed by the consumer.

Our research suggests that the most effective electronic recycling programs are mandated by laws and enforced by regulations. The laws not only mandate manufacturer responsibility and physical take back of products, but also create incentives for clean product design.

In the final analysis, we have to say that voluntary collection programs, like most other voluntary initiatives in society, only draw the active participation of a few of the many potential participants.

Issue 2 Recommendation

The Washington State Legislature should adopt a law for the state requiring manufacturer responsibility in the management of end of life electronic products. While this would be a state law requiring regulations to be developed, plans to be written and approved by the state, and reports to be made, it will not require the state to collect fees or taxes from consumers for program implementation. It will keep government out of the business of handling, managing or paying for end of life electronic products and recycling services. It will minimize government involvement, place responsibility between the manufacturer and consumer where it belongs, and provide the most cost effective alternative for the citizens of the state while realizing maximum recovery of end of life electronic products for recycling.

Government's role is to establish rules and agreements on how we are going to live together and enforcing those rules and agreements on behalf of the citizens the government represents. Government at all levels is not in a position to be involved in the handling the materials of commerce. Government does not manufacture products. Government should not be responsible for handling products and materials at any point in product life-cycles, other than its responsibilities as a user of those products.

Issue 3: Accountability for Historic and Orphan Products

Historic products are those products that will be collected first in any recycling program. The manufacturers of which may no longer be in business or no longer command a significant portion of the product market. Orphan products are those products that cannot be identified or ascribed to any particular manufacturer and are in possession of consumers prior to the adoption of any legislatively established program. This is another major problem that has held back progress in national efforts to establish electronic product recovery programs. The question is who pays for the associated costs for these products?

Presently in 2005, there are an estimated 2,738,947 computers and monitors, and 6,350,331 televisions in use in Washington households. There will be approximately 4 million new computers with their associated monitors and peripherals sold into the state from 2006 to 2010. In that same period, 3.2 million new televisions will be purchased. These numbers will grow each year beyond 2010. The number of products to be managed at end of life in the future far outnumbers the quantity historic products in existence prior to 2005.

This issue should not be a barrier to establishing an electronic product recycling program for the state. These products will be managed.

Issue 3 Recommendations

The responsibility for financing the management of branded historic products will be that of the owner of the brand. A brand that has been acquired by another company will be the responsibility of the acquiring company. Responsibility for branded products from manufacturers that are no longer in business and non-branded orphan products will be divided among current manufacturers whose products are being sold in and into the state for use.

All covered electronic products sold to consumers for personal use must be branded by the product assembler/manufacturer. The branding must be affixed in a way that it can not be removed. The owner of the product at end of life will return their product to the branded assembler/manufacturer according to the process established in the approved end of life management plans.

Issue 4: Scope of Program

There are several aspects to consider when establishing the scope of the program, such as:

- Should the program include reuse?
- What products really should be included?
- Who should be able to use the services?

Reuse

Reuse of products has generally been a private sector enterprise. With products other than electronic, thrift stores and charitable organizations have flourished. Used but usable items available in second-hand stores have value and a market demand.

Certain items loss value quickly, however, and don't have a strong market demand. When these products are donated, or even "traded in" at electronics retailers they are most often considered waste and are sent out for recycling. The intrinsic value to the products may have a lesser value than that of the cost of handling and processing, so a fee is charged for the service. For the thrift industry, these fees constitute a significant portion of their operating budget.

Most products have a cost associated with end of life disposal. The most known and active reuse system in the country is the used car industry. That market is strong, needs no intervention to cause it to work, and is very much part of the socio-economic fabric of our country. However, at the end of their functional life, vehicles go to wrecking yards, for a fee. There they are shredded, with materials of value recovered and recycled.

A similar system for electronic products does not exist.

Products

The legislature identified covered electronic products as televisions, computers and computer monitors sold in the state for personal use. This definition is very narrow in scope, avoiding the inclusion of those same electronic products from commercial, small business, governments and schools. The quantity of electronic products from these sources may well be equal to or greater than the same products in use by consumers for private use.

In addition, there are large quantities of other electronic products available to consumers, many with short life cycles. Cellular telephones, audio equipment, video gaming equipment and home convenience appliances are but a few of them. Add to that the large quantity of office equipment used in small business, government, and schools other than computers, such as fax machines, copiers, printers, calculators, and telephones, the quantities become significant.

The quantity of electronics being recycled and the quantity of products covered by ESHB 2488 is small compared to the quantity available for recycling.

Scope of Service

Due to the fact that the definition of covered electronic products in the law only focuses on consumer level televisions, computers and monitors, one could assume that any collection, transportation and processing system established for product recycling should only focus on the individual citizen's personal use products. However the bill did ask Ecology to evaluate options for small business, governments, schools and charities.

The objective for these sectors should be the same as for consumers; "to find the least cost alternative for the citizens of the state that results in the maximum amount of end of life product being recovered."

Issue 4 Recommendations

Reuse – Reuse is dependent upon the value of the usefulness of a product. If the product remains useful, the value of the product is more than the intrinsic value of the materials of which it is made. When a product is no longer useful, when it can no longer perform the function for which it was designed, that functional value is reduced to zero. The product's remaining value is in the materials that can be recovered and recycled. When the value of the material is less than the cost of handling and processing, the product becomes a liability.

Reuse programs should remain as they are, independent from a regulatory structure. Free enterprise will profit from the reuse of electronics with remaining functional value. If a product is determined to be of no functional value, the holder of that product will be able to send it through the collection, transportation and processing system identified by its manufacturer at no expense.

Products – It only makes sense that any system that is developed be used for all electronic products. At the point that the legislature is willing to address this issue, the same requirements placed on computer and television manufacturers should apply to the manufacturers of all other electronic products.

Scope of Service - The service level provided to small business, government, schools and charities should be equivalent to services provided to private citizens. The economic theory of scale would indicate that the great amount clients served, the lower the cost, as fixed costs can be spread over a broader population. With individuals, business, government, schools and charities involved, end of life management of any product will be cheaper for all. Creating individual programs sector by sector will be most costly and burdensome.

Issue 5: Recovery, Reuse, and Recycling Goals, Standards, Requirements

In our culture people seem to respond to goals or standards. The adage "if you don't know were you are going, any road will get you there" applies here. Determining where to set a goal or performance standard becomes the policy issue. What target is reasonable?

There are no mandatory recycling requirements for any specific material type in Washington State. There are no mandatory state level recycling programs. The Revised Code of Washington requires that local solid waste planning jurisdictions assure that adequate recycling services are available for residents to access. What that access is, is determined by the planning jurisdiction. Local jurisdictions can establish mandatory participation if they choose. Mandatory participation is not required by state law.

In 1989 the legislature established a goal of recycling 50% of solid wastes generated in the state by 1994. The goal was not reached. Reasons for not reaching the goals are many, such as:

- Loss of funding to support public outreach and education programs that inform residents about recycling opportunities;
- The booming economy of the 1990s created more consumption of products while the recycling industry did not keep pace with the supply of recyclable materials available;
- The unprecedented population growth in the state brought new residents who where unfamiliar with recycling opportunities;
- Initiative 601 caused the elimination of programs that supported recycling, such as the tire recycling account and the solid waste management account.

The date to meet the goal was recently changed to 2007. However, it remains a goal without consequences should it not be met.

Goals, targets or standards are only effective if there is a system established to monitor progress and suggest process changes to achieve them. In addition, consequences need to be established and enforced. If such a system is not established, or worse, established and then closed down, the likelihood of achieving the goal, target or standard are limited.

Likely motivators for manufacturers include financial penalties, a loss of the ability to sell their products within the state or a combination of the two depending upon the severity of non-compliance.

Issue 5 Recommendations

Any legislation establishing a product collection, recycling, and reuse program should establish a performance standard and consequences should the standard not be met.

The intention of the legislature should be that all unwanted electronic products be collected and processed at end of life. This would essentially establish a requirement that all products that are no longer wanted must be processed through the established systems. By doing so, the need to establish a percentage recovery rate, along with the difficulties of doing so, are eliminated.

In addition to establishing the legislative intent, a fee for the privilege to dispose of electronic product should be levied. The primary incentive in our culture to encourage consumers to do anything is financial. Using a financial incentive to make the cost of disposal more expensive that recycling will stimulate the desired behavior. A consumer that desires to dispose of an electronic product should be assessed a fee of $25 for that privilege in addition to any associated collection and disposal costs. Such a fee will provide enough of a financial incentive to drive products into the free recycling collection system.

Consequences – Consequences should provide an incentive to comply rather than a penalty for non-compliance. Penalties are only effective incentives when the cost is high enough to cause the desired behavior should there be resistance.

The target year for compliance with an established recovery rate should be 2010. Actions should be taken thereafter, any time that the target recovery rate is not met for two consecutive years.

Depending upon the level of compliance, corrective actions could include:

- A penalty per percentage point not achieved could be assessed
- Required establishment of a reverse distribution system in collaboration with retailers in the state.
- Revocation of the privilege to sell covered electronic products within the state.

The preferred alternative to these corrective actions is a market-based approach using the "cap and trade" model developed for reduction of carbon dioxide emissions. Manufacturers that exceed their recovery target could sell the excess to the companies that do not meet their target. This kind of market competitiveness should stimulate aggressive recovery programs.

Issue 6: What is considered recycling?

ESHB 2488 directed Ecology to recommend an electronic product collection, recycling, and reuse program for the state. According to Chapter 70.95 RCW SOLID WASTE MANAGEMENT -- REDUCTION AND RECYCLING, ""recycling" means transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill disposal or incineration."

Clearly, by this definition, incineration or landfill disposal of end of life products does not constitute recycling. Recycling is "transforming or remanufacturing waste materials into usable or marketable materials…" Since ESHB 2488 is focused on electronic collection,

recycling and reuse, the use of materials contained in electronic products should only be recovered as a material for use within the economy. Those materials should not be used as a fuel in a combustion process.

This does not preclude the application of heat to transform recovered plastics into pellets or scrap metal into ingots or sheets for commercial application, for example. However, the heat source cannot be from combustion of the recovered material itself and be considered recycling.

Issue 6 Recommendations

The definition of recycling is clearly stated in RCW 70.95. Directing recovered material to any other purpose other than "…transforming or remanufacturing waste materials into usable or marketable materials…" will not be considered recycling for purposes of meeting the target recovery rate. This does not exclude the ability to direct the material to an incineration or landfill facility should the manufacturer choose to do so within their plan, nor does it exclude disposal of by-pass wastes and materials with no recycling markets.

Issue 7: Export of Electronic Products - Reference: ESHB 2488, Section 1 (3) j.

The bill directed Ecology to work with the US Environmental Protection Agency to determine the amount of electronic waste being exported from Washington subject and not subject to federal regulation. The bill further directed Ecology to identify methods to determine if exports of electronic waste from Washington are in compliance with national laws in destination countries.

There is currently no way of knowing how much electronic product is exported for reuse or recycling in foreign countries. Exports are not track in the level of detail needed. Exports are tracked by codes established by the Census Bureau and assigned by the exporter. These codes are known as harmonized tariff codes. There are no separate codes for international trade in waste electronics for recycling and reuse. When electronic products are exported as a recyclable commodity, they are not subject to reporting requirements established by 40 CFR 262. The codes that can be used to record their export might include "recyclable materials" which includes everything from plastics to paper to scrap metals; or "televisions" which include all televisions use or new.

There is a potential of petitioning for additional codes to track recyclable materials separately. The amount of time necessary for that process is unknown.

We do know how much hazardous waste has been exported to foreign countries due to reporting requirements established by the federal government. Under 40 CFR 262, any hazardous waste that is exported must be reported to the US EPA. The EPA has made their information on hazardous waste exports from Washington available to Ecology. There is no reporting of electronic waste being exported.

According to anecdotal information from environmental groups and recycling businesses, the percentage of electronic waste collected for recycling that eventually is exported offshore is quite high.[v] The Basel Action Network (BAN), a Seattle based group that tracks this issue,

believes that the figure for Washington State is probably around 50%[4]. Earlier, BAN estimated the figure at around 80%, but since then much of the waste has been directed to more responsible recyclers that refuse to export hazardous components. The 50% figure, while speculative, is realistic because the economics of the trade makes sense. Asian markets pay the highest for metal scrap, the labor costs there for low-tech and often dangerous recycling is very cheap, and due to environmental norms in North America, consumers are willing to pay recyclers to take their equipment. Material processors charge consumers to take their products for recycling and then, after processing sell the material to Asian scrap brokers. Further, due to the imbalance in trade between the US and China, the cost of sending back a container to China is at the low end of the shipping business because China needs containers for export.
In the mean time, there is no way to regulate the export of materials designated as recyclable. Materials can slide through the ports of Washington un-noticed. When delivered to the buyer in the receiving country, there are no mechanisms that create a traceable path back. The buyer owns the material and is at liberty to determine what is done with it, even if it is disposed.

The Basel Action Network has provided these additional comments:

> While the export of the electronic waste is not illegal, the importing of hazardous wastes by most Asian countries is. This is due to two reasons. First, there are national import prohibitions for electronic waste in some countries. China, most notably, has had an import ban in place for the last 5 years. The second reason is due to the Basel Convention on the Control of the Trans-boundary Movement of Hazardous Wastes and Their Disposal. Under the Basel Convention, certain electronic equipment at end-of-life, going for recycling and/or disposal, is considered to be a hazardous waste. Among other electronics, this includes cathode ray tubes found in monitors and TVs, as well as circuit boards, which are likely to qualify as hazardous waste because of their high leaded-solder content.
>
> Most countries of the world are Parties to the Basel Convention (currently the number of Parties or ratifiers is 165). The United States is not a Party to the Convention. The Basel Convention stipulates that Parties cannot normally trade in hazardous wastes with non-Parties without a special multilateral or bilateral agreement, consistent with the Basel Convention. The US is Party to one such agreement for export and that is an agreement with the OECD group of 30 developed countries. However, developing countries in Asia and elsewhere, which are almost all Basel Convention Parties, are forbidden from importing hazardous electronic waste from the United States. In fact, the list of countries for which import of hazardous electronic waste from the US is illegal is around 130 countries (attached).
>
> It is expected that despite the violation of the laws of importing countries, this export still takes place from Washington State and elsewhere in the United States, regularly. The reason for this is that it is very difficult for importing countries to enforce import bans due to the sheer volume of containers arriving at ports, the difficulty in assessing whether equipment is working or non-working (wastes), and a general lack of enforcement infrastructure in developing countries. Further, many exporters are known to provide

[4] **"Exporting Harm: The High-Tech Trashing of Asia",** www.ban.org

bribes to ensure that containers arrive uninspected. Finally, as long as the US remains outside of the Basel Convention or otherwise refuses to control its hazardous electronic waste exports, the export is entirely legal in the US territory. However, it is not advisable for Washington to continue to allow such aiding and abetting of such illegality even if it technically occurs on foreign shores.

Meanwhile other developed countries are increasingly stepping up enforcement and controls on such exports. The European Union has banned such exports of hazardous electronic waste in accordance with a Basel Convention decision (Basel Ban Amendment) and has recently engaged in an enforcement exercise to educate their exporters and waste brokers. Canada has notified all recyclers that it is forbidden to export electronic waste to China (because of the Chinese import ban). Australia has strictly regulated its exports and requires significant testing to show that equipment being exported is not waste but is in working condition.

In the absence of similar federal action, States have tried to place restraints on export. It remains to be seen whether these efforts will prove effective in stemming the export tide. Lastly, will new information become known in relation to hazard characteristics of electronic products and the materials from which they are made? Concerns over materials such as polybrominated diphenyl ethers (PBDEs), the fire retardant contained in most covered electronic products, are being raised.

Issue 8: The Effects of Landfill Disposal Bans and Suitability of Lined and Unlined Landfills for Disposal of Electronic Products - Reference Section `1 (2) f and Section 1 (3) g.

Disposal bans of various products have been adopted by state and local governments throughout the country. Generally, disposal bans are imposed to improve the quality of the waste stream entering waste management facilities. For example, cathode ray tubes are banned from disposal in Massachusetts due to the fact that the state is heavily dependents upon incineration of solid wastes. Eliminating lead sources improves the quality of air emissions and ash that will be disposed.

Bans are also used to encourage utilization of particular materials rather than disposal. Materials have value that should be retained within the economic system. A metals disposal ban, for example, would assure that materials such as aluminum and steel are recycled.

Again, local government has lead responsibility for solid waste management. While there are no statewide product disposal bans in Washington, 13 counties in the state have initiated bans or actions that have the same result, on disposal of certain electronic products. See Table XX that summarizes these local government actions in Washington.

There is no evidence that disposal bans result in illegal dumping of the banned product.

Contemporary landfills are designed to assure that, to maximum extent possible, contamination of groundwater, surface water, and air are minimized. Leachate collection systems gather and recirculate, or treat, the water within the landfill. Methane gas generated within the landfill is collected for energy use, but is most generally flared.

The Solid Waste Association of North America completed a study entitled “The Effectiveness of Municipal Solid Waste Landfills in Controlling the Releases of Heavy Metals to the Environment.” The study bottom-line was that MSW landfills, when designed and operated properly, provide sufficient controls in the release of heavy metals to the environment.

In a letter to Bill Smith, City of Tacoma, Washington, Solid Waste Division, from SWANA, Director John Skinner stated in reference to the report mentioned above: “It is very unfortunate that this report is being used to discourage product stewardship and recycling programs for electronics and other metal-containing products. As clearly stated in the report, SWANA

County	Landfill	Incinerator	Transfer Station	Export?	Bans	Bans on Residents or Business?				Recycling Programs						
						Computers	Televisions	Monitors	Others	Partnership	Ongoing	One-time	Type	Fee	Incorporated	Subsidized
Adams	0	0	2	Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Asotin	1	0	0		N	-	-	-	-	Pb	N	Y	Drop-off	Resident free, business pay	N	N
Benton	1				Y[1]	B,R	B,R	B,R	-							
Chelan	0	0	3	Douglas County landfill	Y	B	B	B	-	Pb	Y	N	Annual drop-off	Determined by weight		
Clallam	1	0	0	No	N	-	-	-	-	N	N	N	-	-	-	-
Clark	0	0	2	Morrow, Oregon landfill	N	-	-	-	-	Pb-Pr	Y	N	Drop-off	Resident free, business $10/item	N	Y
Columbia	0	0	1	Walla Walla landfill	N	-	-	-	-	N	N	N	-	-	-	-
Cowlitz	1	0	0	No	N	-	-	-	-	N	N	N	-	-	-	-
Douglas	1	0	0		Y	B	B	B	-	Pb-Pr	Y	N	Annual drop-off	$15,$25/TV, $10/CPU, $12/monitor	N	N
Ferry	0	0	1	Klickitat County landfill	Y[2]	-	-	B,R	-	N	N	N	-	-	-	-
Franklin					N	-	-	-	-							
Garfield	0	0	1	Asotin County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Grant	1	0	0	No	Y	B	B	B	B	Pb	N	Y	Collection event	$0.35 per pound	N	N
Grays Harbor	0	0	6	Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Island	0	0	4	Klickitat County landfill	N	-	-	-	-							
Jefferson	0	0	1	Klickitat County landfill	N	-	-	-	-	Pr	Y	N	Drop-off	$0.35 per pound	N	N
King	1				Y	-	B	-	-	Pb-Pr	Y	N	Take-It-Back network	End-of-life fees	N	
Kitsap	0	0	1		Y	-	B,R	B,R	-	Pr	Y	N	Drop-off	$17-40/TV, $10/monitor	N	N
Kittitas	0	0	2		N	-	-	-	-	Pb	Y	N	Drop-off	Unknown	N	
Klickitat	1	0	0	No	N	-	-	-	-	N	N	N	-	-	-	-
Lewis	0	0	2	Klickitat County landfill	Y	B,R	B,R	-	-	Pb	Y	N	Drop-off	$2/CPU, $8/monitor	N	N
Lincoln	0	0	1	Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Mason	0	0		Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Okanogan	0	0	3	Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Pacific	0	0	2		N	-	-	-	-	N	N	N	-	-	-	-
Pend Oreille	0	0	3	Klickitat County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Pierce	1	1	0	No	Y	-	B	B	-	Pr	Y	N	Drop-off, curbside	Varied	N	N
San Juan	0	0	3	Arlington, Oregon	N	-	-	-	-	N	N	N	-	-	-	-
Skagit	0	0	3	Klickitat County landfill	N	-	-	-	-	N	N	N	Refer to King County	-	-	-
Skamania	0	0	1	Klickitat County landfill	N	-	-	-	-							
Snohomish	0				Y	B,R	B,R	B,R	B,R	Pb	Y	N	Drop-off	$20/TV, $10/CPU, $14/monitor, $27/console	Y	
Spokane	0	1	2	Klickitat County landfill	Y	B,SQG	B,SQG	B,SQG	-							
Stevens	1	0	4	No	N	-	-	-	-	N	N	N	-	-	-	-
Thurston	0	0	1	Klickitat County landfill	Y[3]	-	B,R	B,R	-	Pb	Y	N	Drop-off	$5 plus weight, $10/CRT	Y	Y
Wahkiakum	0	0	1	Cowlitz County landfill	N	-	-	-	-	N	N	N	-	-	-	-
Walla Walla	1	0	0		Y	LQG	LGQ	LQG	-	Pr	Y	N	Drop-off, pick-up	Varied		
Whatcom	0		4	Klickitat County landfill	Y	B	B	B	B,R							
Whitman	0		1	Arlington, Oregon	N	-	-	-	-	N	-	-	-	-	-	-
Yakima	2	0	1		N	-	-	-	-	N	-	-	-	-	-	-

[1]Electronics are not official banned, but are not accepted at transfer stations. [2]Electronics are not officially banned. The county inspects load and diverts computer monitors from landfill whenever possible. [3]Electronics are not officially banned, but CRTs are collected separately from trash.
B=Business, R=Residents, SQG=Small quantity generators, (SQG includes residents and unregulated generators that fall below LQG threshholds), LQG=Large quantity generators, Pb=Public, Pr=Private

endorses and actively promotes the implementation of economically and environmentally sound waste reduction and recycling programs for products containing heavy metals.

"As evidence of this support, in 2001, SWANA's International Board of Directors unanimously approved our Product Stewardship Policy. The purpose of this policy is to establish guiding principles for SWANA and its members to use as they collaborate with manufacturers and designers in developing programs to manage products at the end of their life. To quote from that document, which can be found in its entirety on our web site: *"Policies that promote and implement product stewardship principles should create incentives for the manufacturer to design and produce products that are made using less energy, materials, and potential pollutants, and which result in less waste (through reduction, reuse, recycling, and composting) and use less energy to operate…""*

There is an axiom within the field of engineering that says that anything engineered will eventually fail. Landfills are no exception. Landfills are designed and constructed to protect the environment during the active life of the landfill and some time after closure. There has been no experience with contemporary landfills after closure that would suggest that a landfill becomes benign at some point in the future. While "financial assure" regulations have been established to assure a source of funding for post closure care of these facilities, it is not known how long post closure activities will be required. Will the "financial assurance" provided for closure and long term care of landfills match the timeframe of the term needed? Or, will this generation pass yet another long -term financial burden to future generations?

The sanitary revolution of the 1800s brought the need for management of wastes was a public health concern. The need for sanitary disposal of wastes to assure that disease was not spread through vector contact was paramount. Wastes were burned in pits or dumped at sea.

The concept of using sanitary landfills for disposal of wastes was adopted in the late 1960s when air quality concerns caused the closure of open burning dumps. In the 1980s, early landfills began to leak, contaminating groundwater and releasing methane into the atmosphere and through sub-terrainian migration. Costs to state and local governments to cleanup these sites were high and the issue politically charged. The public began to pay for cleanup and emissions controls at the old landfills, while at the same time, paying for new disposal facilities. The costs for waste disposal skyrocketed. Old landfills like Midway and Kent-Highlands in King County are still being monitored and managed, at public expense. Interestingly until recently, wastes disposed consisted primarily of food waste, animal carcasses, ash and "rubbish" (no longer usable or repairable items of furniture, paper, etc.). Petroleum products, plastics and consumer packaging began to grow as an increased portion of wastes in the 1950s.

As our ability to create more sophisticated and complex materials has increased, especially over the past 35 years, wastes have in turn become more complex. Metals and human made compounds the like we have not seen before are being disposed of in landfills at an increasing rate.

The long-term effects of the materials, in combination in a landfill or upon potential release into the environment, are not known.

However, materials placed in landfills are permanently taken out of use in the economy. In their place, new materials have to be extracted and processed from ores, petroleum, and other natural resources. The long-term effects of these activities on the environment, energy consumption, air emission, and worker's health are known.

Environmental Impact of New Material Extraction

Computers and televisions are made of over 30 different minerals. Mining those minerals is highly disruptive to the environment. Activities such as drilling, trenching, and road building not only "scar" the land, they also impact water quality, vegetation, and natural habitats. Wildlife faces the loss of habitats and food. It becomes a greater concern if there are endangered species within the area.

Chemicals in ores, when in contact with water, dissolve and become toxic or acidic. Water from abandoned mines also contains heavy metals such as arsenic, lead, mercury, zinc, and cyanide. The water eventually drains into soil and streams or deposits in pits and ponds. Such run-offs can be harmful, or even deadly, to plant and aquatic life as well as native species and humans.

Mining also leaves behind large piles of waste rocks, or tailings. Tailings have high content of sulfides and heavy metals that seep into soil and ground water. Sometimes containers of chemicals are abandoned on site. Left unchecked, these chemicals will add to pollution problems.

Large amounts of money have been put into mine pollution control. According to the EPA, the U.S. spent $1.5 trillion on abatement and control in 1982. Since then, the cost has been increasing by $100 billion each year.

In general, product disposal creates more demand for minerals. Even if the lined or unlined landfill designs prevent leakage, hazardous chemicals will still enter environment from mines. And if landfills fail, the costs of cleanups will be even greater.

Energy Consumption

Aside from resource conservation, recycling can greatly reduce the net energy consumption. The energy it takes to recycle is significantly less than the energy used to extract and process raw materials to replace those that have been landfilled. Landfills eliminate a means of conserving the energy that is, in many cases, non-renewable.

Studies show that recycling glass, plastic, steel, aluminum, copper, lead, and zinc do make a difference in energy consumption. The Institute of Scrap Recycling Industries has estimated that recycling can save 31 to 95 percent of the energy used compared to raw material extraction and processing, depending upon the material. The Natural Resource Defense Council and Office of Technology Assessment estimate that between 4.7 and 196 million Btu of energy are saved for each ton recycled. According to MBA Polymers, recycling engineered thermoplastics can conserve up to 97 percent of the energy used to manufacture virgin resins. The findings are summarized in Table 1.

Table 1. Energy conserved per ton of material recycled

Material	% Energy Saved[1]	Million Btu[2]
Aluminum	95	196
Copper	85	72
Lead	65	16
Steel	61	14.3
Zinc	60	38
Plastic[3]	97	77.6
Glass	31	4.7

Sources: [1]The Institute of Scrap Recycling Industries.
[2]The Natural Resource Defense Council (glass, steel, aluminum); Congress Office of Technological Assess-ment (copper, lead, zinc). [3]MBA Polymers report.

The EPA has estimated the energy savings by recycling an average 60 lbs desktop computer with monitor. The estimates are based on the percent weight and recyclability of the materials contained in such units. Taking the data in account and assuming 477,000 desktops could be recovered in Washington in 2006, conservation of up to 470 billion Btu could be realized. The amount is equivalent to 3.8 million gallons of gasoline, or enough electrical energy to power over 5,000 households for one year. This is the energy that would be "lost" if the computers are disposed inside landfills. Table 2.

Table 2. Energy Conserved from Recycling Computers in Washington State

Est. target unit recovered, WA '06			477,064	<<<Assumes 80% of estimated personal computers available for recovery will be recovered and that 94% are desktops (Hennepin County data)
Equiv. gallon of gasoline saved			3,779,155	
Equiv. number of households energy consumption			5,124	
Material	**Ton recovered**	**MBtu saved**	**Equiv. barrel of gasoline**	

Glass	72	339	65
Plastic	658	51,088	9,735
Steel	2,404	34,383	6,552
Aluminum	1,603	314,175	59,866
Copper	902	65,144	12,413
Lead	43	670	128
Zinc	172	6,595	1,257
TOTAL	5,854	472,394	90,014

While not the highest and best use, it is possible for plastic parts to be used as fuel in waste-to-energy facilities. The facilities may be located near landfills and transfer stations where incoming wastes can be quickly diverted to furnaces. The materials can be incinerated as either refuse derived fuel (RDF) or processed engineered fuel (PEF). RDF often comes from unprocessed municipal solid waste; PEF is source-separated, compacted plastic with added dyes to increase the heating value. Using PEF can capture up to 16,000 Btu per pound. This amount, however, is less than half the 38,000 Btu per pound saved when plastic is recycled.

Air emissions

Mining releases more harmful substances into the air than obtaining materials from electronic scraps. Although there are no emission rates reported for electronic recycling, emissions from metal mining are significant enough to warrant data collection. Ore extraction requires mine exploration, site construction, blasting, drilling, conveying, hauling, crushing, grinding, and separation. The activities create more air pollution than simply collecting, transporting, and dismantling electronics for metal parts.

The mining industry uses blasting agents, explosives, heavy machinery and more in its operations. Blasting often produces carbon monoxide and, if unregulated, can threat nearby residents. Explosives detonation, coal burning, and combustion engines all release hazardous air pollutants (HAP), volatile organic compounds (VOC), and nitrogen oxides (NO_X) into the air. Hazardous air pollutants are suspected to be the cause of a number of illnesses, including cancer. Volatile organic compounds form ground-level ozone, damaging crops and vegetation. Nitrogen oxide has proven to be harmful to both the environment and human health. Emissions within these categories, by metal mining, must be reported to the EPA on an annual basis. Table 3 summarizes 1996 data for six common ores.

Table 3. 1996 Emission data for metal mining industry, in tons

Ore Type	NO_X	HAP	VOC
Iron	35,349	838	176
Copper	6,842	38	1,525
Gold	2,217	1,068	162
Lead, zinc	3	2	10
Silver	46		

Source: The EPA National Emission Trends and National Toxic Inventory databases

After mining, the ores must undergo primary processing to separate out nearly pure metals. Scrap metal, however, is recycled through a secondary process. Both processes involve the roasting, sweating, smelting, and sintering of metals. The operations remove contaminants; however a small percentage is still vented into the air. Such contaminants include mercury, cadmium, arsenic and oxides of lead, nitrogen, zinc, and sulfur. Sulfur dioxide, once in contact with moisture in the atmosphere, forms sulfuric acid. Sulfuric acid is a known cause of acid rain.

Table 4 compares emission rates of primary to secondary smelters and refineries. To meet the same output, primary smelters emit over 150 times more sulfuric acid, 67 times more arsenic, and 4 times more lead fumes into the air. Ores generally have more contaminants which, when processed, are released into the atmosphere.

Table 4. 1993 Emission from non-ferrous primary and secondary (recycle) smelters/refiners, in pounds[1] per million pounds of metal[2] produced

Chemical[3]	Primary	Secondary
Antimony	1,800	140
Arsenic	5,400	80
Cadmium	2,200	450
Chromium	100	280
Copper	100,000	7,700
Lead	47,000	11,000
Nickel	900	840
Sulfuric acid	85,000	550

Source: [1]EPA/310-R-95-010, fugitive and stack air emission.
[2]USGS Commodity Statistics and Information, production of aluminum, gold, copper, lead, nickel, silver, tin, zinc.
[3]EPA/310-R-95-010, also including compounds containing the chemical.

Similar generalization cannot be applied to plastic and glass, as these materials are not made directly from ores. Plastic is produced by chemical reaction of petroleum by-products and polymerization. Glass is made by melting silica sand, dolomite, lime, soda and other raw materials. Recycling these materials, however, can still reduce emissions.

Computer and television plastics are a mixture of different resins. Television housings are primarily a mix high-impact polystyrene (HIPS) and acrylonitrile butadiene styrene (ABS). The plastic may have extra coating, flame retardants, and non-plastic parts

attached. Recyclers do have the technology to remove these “impurities” and separate out resins. MBA Polymers, for example, grinds up plastics and uses a hydro-cyclone method to sort resins based on the difference in density. The process is highly automated with no emissions. Virgin polystyrene production, on the other hand, emits 1.2 to 6.7 pounds of VOC per ton.

Cathode ray tube (CRT) glass contains lead oxide and is often used as a fluxing agent in smelters (see Table 2). Glass not landfilled or smelted may be sorted, cleaned, and shipped to glass manufacturers. Manufacturers would melt the broken glass, called cullet, with raw materials to make new CRTs. Though cullet may carry some contaminations, its lower melting temperature decreases the heat input to the furnace. According to the Glass Packaging Institute, for every 10% cullet feed the energy consumption is reduced by 2.5%. Less burning of natural gas, LPG and heavy fuel oils would, implicitly, lower emissions.

Worker’s health and safety

The Bureau of Labor Statistics has published illness data for metal mining and garbage collection as well as primary and secondary non-ferrous metal industry. Workers in the primary industry have an illness rate of 182.5 per 10,000 workers, greater than 140.5 in secondary, 32.2 in mining, and 17.3 in garbage collection. Figure 1 shows primary processing leading in cases of skin disease and repeated trauma disorders. Secondary processing, or recycling, has the highest rates of metal poisoning and respiratory illness. Mine workers are most at risk for lung diseases. Exposure to “rock dust” causes silicosis, the scarring and deterioration of lung tissues. There is no cure for silicosis; the damage is permanent.

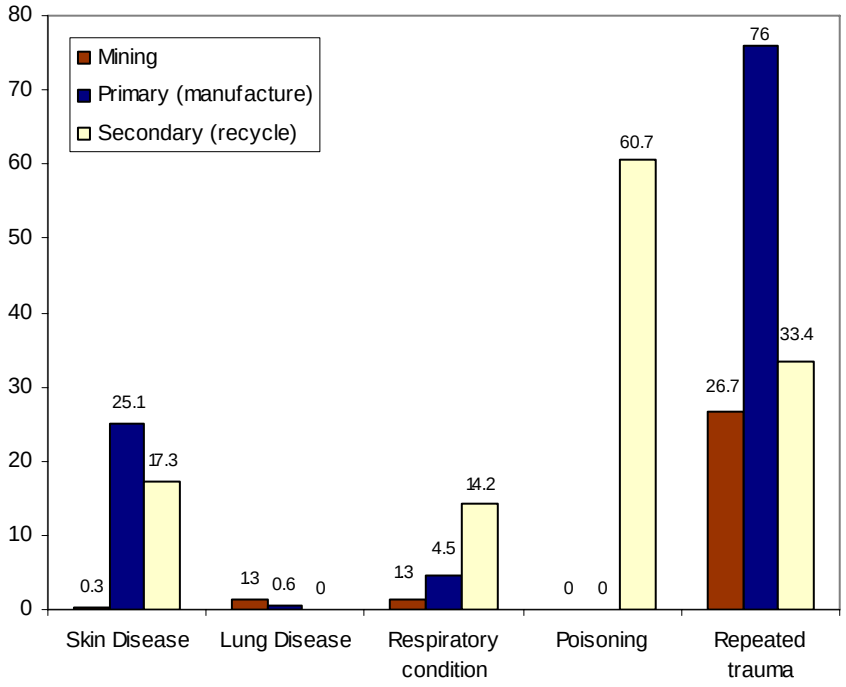


Figure 1. 2001 Illness rate per 10,000 FTE
Source: Bureau of Labor Statistics

*Data from 2003

There is more risk of injury in recycling than in metal mining and manufacturing. The secondary non-ferrous metal industry has an incident rate of 10.6 per 100 FTE, 2.5 greater than primary and 6.7 greater than mining. Half of the injuries in recycling are in the nature of strains, sprains, cuts, or bruises. These incidents can be prevented by improving worker's training and safety awareness.

In 2001, metal mining industry reports a fatality rate of 157.3 per 100,000 FTE for underground mines. Workers are subjected to damp, dark and confined spaces, often under high heat and noise. There are also dangers of explosion, cave-in, electric shock, and exposure to harmful gases. Because of the harsh working conditions, underground mining is one of the most deadly occupations in the U.S.

Figure 2 contains recent fatality data on mining, waste collection, landfill operation, and non-ferrous metal manufacturing and recycling. Underground miners have an overwhelming lead fatality rate. The second highest is garbage collection, which may be even more dangerous if more hazardous substances enter the waste stream. Workers in other industries have significantly lower rates, ranging about 15 to 20 per 100,000 FTE.

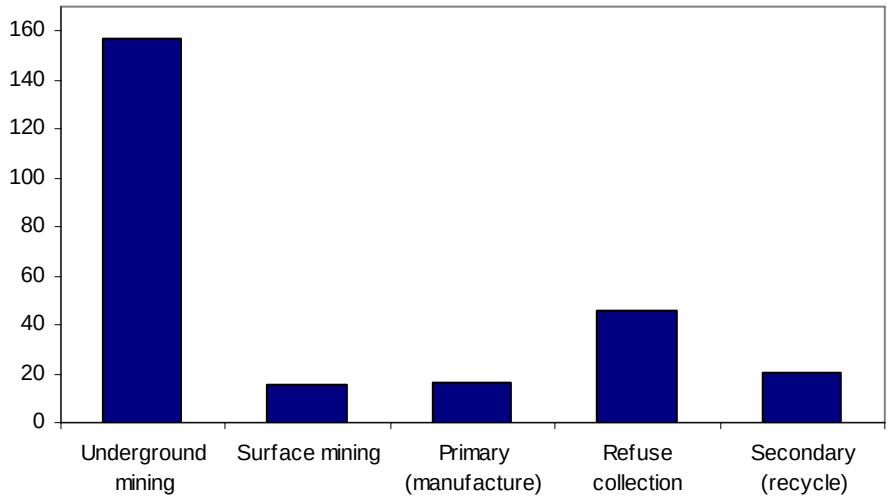


Figure 2. 2001 Fatality rate per 100,000 FTE, by industry
Source: Bureau of Labor Statistics
*Calculated from 2003 data

Underground mining and waste collection place workers' lives at extremely high risks. Landfill disposal, despite its lower fatality, indirectly exposes more miners and garbage collectors to the dangers. Advances in technology have reduced occupation hazards over the years. It is unclear if mining and collection, with all their implications, will become safer than recycling in the future.

Issue 9: Business Financial Incentives - Reference Section 1 (3) h

Financial incentives can be effective tools to encourage public policy. It is important that when considering incentives that they be used at leverage points that will result in the fastest and most complete adoption of the policy.

Within product life-cycles there are many potential leverage points. The state needs to consider the following when creating financial incentives:

- At what point within a product life-cycle can the incentive be applied and is that point within the influence of the state?
- What is meaningful, in financial terms, for an incentive to be effective?
- What will be the overall systems effect of an incentive? Will the incentive, if applied at one point of the life-cycle, have a "domino effect" throughout the system that results in the intended outcome? Will it have an unintended consequence?
- Will the incentive, while providing a positive effect related to the specific public policy, have a negative effect on a different policy?
- What will be the financial gains or losses to gross state product; jobs, business and state revenues?
- Is the incentive an appropriate signal economically over the long term?

From analysis of the material flows from covered electronic products it would be safe to say that marketing to users of secondary materials to be used in the manufacture of new products provides a block to additional materials being used. If at any point along the material flow cycle there is a blockage, the flow slows down, prices drop and good, usable material becomes waste, destined for landfill disposal.

The state of Washington could provide incentives to manufacturers that would use secondary materials in their manufacturing processes. Two incentives worth pursuing include:

1. A resource conservation tax credit against the company's B & O tax liability; and
2. Low interest loans to businesses to provide necessary capital to build manufacturing facilities within the state and use recovered materials as feedstock for their new products.

Issue 10: Economic Development Opportunities, Stimulating Materials Markets and Jobs - Reference Section 1 (3) f.

It is generally accepted, and documented, that adopting public policy that directs materials to recycling creates more jobs and stimulates more economic activity than does waste disposal activity. The main activities in this state related to electronic product recycling have been collection and processing. There are no end use markets for recovered electronic products within the state. Material is exported out of state, with most going out of country.

What are the opportunities for business recruitment of users of recovered electronic materials within the state?
Are there ways to improve and increase processing capacity within the state in order to market a value added product, resulting in more economic activity staying state-side?

The recommendations in Issue 9, particularly the provision of low interest loans, would go a long way in attracting end users of recovered materials to Washington, creating markets for those materials and jobs for workers.

Potential Impacts on Jobs

Recycling "stands out as a proven job creator and economic growth generator", according to the Institute for Local Self-Reliance. Despite the rise in unemployment rate in the US, recycling has an annual increase of 8.3% in the number of jobs from 1967 to 2000. Although a part of this growing industry, electronics recycling does not have a long record of employment data. It seems logical that activities such as collection, transport, reuse, dismantling, and recycling would produce more jobs than waste hauling, disposal, or incineration. The assumption is supported in a number of studies. Experts use both raw data and economic modeling and analysis to predict the impact of e-waste on employment.

The Jobs and Market Development Working Group did a study on Oregon's economy. The state can expect 40 new jobs for every 10,000 tons of e-waste collected each year. The study did not take into account advanced fees, collection from large businesses, improved rural infrastructure, change in product designs, and other externalities. It does, however, provide a basis for comparison should the state implements a program with such improvements.

The California University, Berkeley conducts a statewide study on the waste disposal and diversion system. Economic impact analysis and waste flow model estimate that recycling creates 47 jobs for 10,000 tons of e-waste per year. The report is submitted to the California Integrated Waste Management Board in 2001, prior to the implementation of the statewide advanced recycling fees on electronic equipments. The effects of the fees on employment are not yet known.

The Institute for Local Self-Reliance has documented jobs creations over the years. Data indicate that computer reuse generates 296 jobs for 10,000 tons per year; waste disposal only create 1 per 10,000 tons. Sorting and processing alone creates 10 times more jobs than disposal and incineration. There are concerns that recycling will lower employments in the disposal and raw materials industries. According to North Carolina data, having 100 recycling jobs would results in the loss of only 10 jobs in waste hauling and disposal and 3 in the timber harvesting industry. There is still an increase in employment overall.

Grassroots Recycling Network, made up of waste reduction experts and recycling professionals, does it own research on e-waste recycling. A total of 290 jobs is estimated for every 10,000 tons collected each year. The number applies to a full-scale, producer responsibility program.

Studies being done Washington are also consistent with other researches. According to numbers from the Washington statewide recycling survey and recycling industries, 400 jobs being created for 10,000 tons of computer and computers parts. The data, however, do not consider computers and television from households and small quantity generators only. For such case, Cascadia Consulting Group has estimates for an e-waste take-back program in the state. By 2010 Washington is expected to see 245 jobs created for 10,000 tons of electronics.

All studies arrived to the same conclusion: recycling will lead to growth in employment. Recycling, overall, can support 2-10 times the number of jobs as disposal. E-waste recycling can have up to 40 times the number of jobs. A state or nation wide take-back program for electronics can create 245-290 times the number of jobs.

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Issue 11: Urban and rural recycling challenges - Reference: Section 1(2) a.

A state as diverse as Washington faces many challenges. One size fits all solutions do not work well here. Our current solid waste management laws direct local governments to create solid waste management plans that determine the best systems for unique local circumstances.

Even though there is ubiquity of products, materials and marketers throughout the country, it is difficult to reverse the product delivery system to take back product after they have been distributed. As population densities get smaller, cost effective collection options become limited.

Local governments have assured that services for collection of wastes and recyclable materials are available to all within their planning jurisdiction. In some areas, drop-off systems are effective, while in dense urban populations, curbside and drop-off opportunities might be offered.

Electronic products pose unique problems for collection. Among them, size and weight concerns related to worker health, safe handling of glass picture tubes containing lead and exposure of the product to moisture. These issues make certain kinds of collection, particularly at curbside, difficult if not impractical.

Collaborating with local government solid waste planning jurisdictions and taking advantage of available public and private infrastructure will assure that services are available throughout the state that are convenient and practical in both urban and rural settings.

Urban and rural challenges and issues

The Census Bureau defines an urban area as a census "block" with a population density of at least 1,000 people per square mile and surrounded by blocks with an overall density of 500; any area outside urban is classified as rural. Western Washington is generally more urbanized while eastern is mostly rural. Significant differences in population create challenges that call for different solutions in the state.

Some issues are more common to urban areas; others are associated with rural. It is difficult, however, to determine the effectiveness of the solutions because of other contributing factors. For example, is the amount of products collected through an event a result of incentives, good publicity, or buildup of materials in households? It may be any one or a combination of these.

Rather than rating and comparing the effectiveness of the programs, it is better to look at how each are designed to address some of the common challenges. Such designs may be modified to fit the needs of Washington State. Tables 1 and 2 identify programs that meet the challenges.

A. Rural Recycling

<u>The Effects of Disposal Bans on Rural Recycling of Electronics</u>

Rural recycling, in some areas, cannot compete with landfilling, based strictly on traditional program cost modeling. For example, some collection sites charge end-of-life (EOL) fees, making it cheaper for citizens and businesses to dispose their equipments elsewhere[5]. The result is lower recycling rates in a number of communities.

If disposal is no longer an option, recycling becomes the primary mean for handling end-of-life equipments. A ban would support recycling and reuse as well as prevent hazardous materials from entering the waste stream. There are examples of various bans at national, state, and local government levels:

- The Netherlands bans all electronic equipments from landfills and incinerators[6].
- Switzerland prohibits the disposal of combustible materials in municipal solid waste.
- Maine indirectly bans landfills by making household monitor and television recycling mandatory.
- King County landfills and transfer stations no longer accept computers and televisions for disposal.
- Douglas and Chelan Counties do not accept monitors, televisions, and computers from businesses for disposal.
- Snohomish County Health Department regulations does not allow disposal of hazardous wastes in landfills in the county. As a result monitors, televisions, and computers, from residents and businesses are not accepted for disposal.

<u>Encouraging Participation in Rural Areas</u>

Rural communities tend to have relatively low participation in recycling programs. For various reasons, a large percentage of the population would not bring in old products[7]. Some

[5] Park, Sage, "Electronics Collection in Central Washington," Department of Ecology, Oct. 2003.
[6] "Electrical and Electronic Equipment: Waste in the Netherlands," June 2001, The Netherlands Ministry of Housing, Spatial Planning and the Environment, 14 Apr. 2005 <http://www2.vrom.nl/Docs/internationaal/14285_174elericalequipme.pdf>.
[7] "Rural Community Electronics Recycling Project – Award #01, Final Report," October 2002, North East Recycling Council, Apr. 13, 2005 <http://www.nerc.org/documents/rlcmelrec1102.html>.

households have equipments in storage already and are reluctant to pay EOL fees; others are not even aware of recycling opportunities.

Higher participation rates may be prompted by mandatory recycling laws. It is unclear, however, if such laws will draw more materials out of storage. Some governments have authorized front-end fees, charged to consumer at the point of sales, to finance a program. Once the recycling is prepaid, consumers are more likely to bring back equipments. Such laws are currently in effect:

- The Netherlands Disposal of White and Brown Goods decree leads to front-end fees and "disposal levy" charged at the point of purchase.
- The Swiss Ordinance on the Return, Taking Back, and Disposal of Electrical and Electronic Appliances obligates all end-users to turn in covered equipments. The ordinance also establishes front-end fees.
- California SB 20 mandates advanced recovery fee program.
- City of Kirkland incorporates recycling fee into garbage collection fee, charged equally to all households. The recycling is, in a way, prepaid.

Incentives to Rural Consumers

Electronics owners may be more willing take equipments out of storage if there are benefits or incentive provided them or if no fee is charged when turning the product in for recycling. The fees can be eliminated, or at least reduced, with subsidies from the government, manufacturers, retailers, and other entities. Some manufacturers do sponsor "free", no-EOL-fees events. Others offer discounts and rebates if their brands are returned. Incentives vary, depending on the type of program:

- The Netherlands ICT-Milieu is financed by manufacturers. Consumers may not be aware that manufacturers can internalize the cost and build it into price of new products.
- Gateway recycling offers rebate to consumers who purchase their brands when returning an unwanted computer.
- Hewlett-Packard, Best Buy, and Starbucks teamed up to hold a free event.
- Hewlett-Packard and Office Depot teamed up to hold a free event with consumers dropping off their used products at Office Depot stores. Consumers were limited to returning one item per day.
- NxtCycle Shared Responsibility program is partially subsidized by six manufacturers. The manufacturers pay a percentage for recycling their own brands. Consumers receive credits for bringing back brands of participating manufacturers.
- Clark County Computer Reuse and Marketing program is financed by grants from the government.

Marketing and Promotion

Advertising can also raise participation, as all residents should be well-informed of recycling opportunities. For example, the Basin Disposal event in Franklin County was advertised for several weeks on television, radio, flyers, and mailed newsletters. It is hard to determine the effects of the ads because there were no similar events like it with which to compare. The Take-It-Back Network in King and Snohomish Counties also launched an ad campaign by radio, e-mail, website, and flyers passed out at transfer stations. A study done by the City of Seattle related to the Take-It-Back network showed that direct mail and billboards are the most effective means of promotion in rural areas[8].

Transportation Costs

Transport costs are usually higher in less populated areas where the travel distance between collection sites and vendors are greater. It becomes necessary to collect and store materials until

[8] "Tool Kits for Setting Up Electronics Recycling Programs: Section 1," May 2003, Northeast Recycling Council, Apr. 19, 2005 <http://www.nerc.org/adobe/NebraskaToolkitSection-I.pdf>.

there is enough volume to cost-effectively transport them directly to recyclers. There are several methods of consolidations:

- The Netherlands uses existing infrastructures. Consolidation points are already available in distribution centers, municipal centers, and regional storage stations.
- Japan relies on retailers and local governments for consolidation points.
- Maine set up statewide consolidation centers to take materials from residents and municipalities.

Capacity to Manage Hazardous Materials

There are communities that collect "informally" whenever residents bring in used products. These places are generally unprepared and unequipped to receive wastes containing hazardous substances. There are concerns that the materials will not be handled or stored in a safe manner.

Staff training and education can help eliminate unsafe practices. The King County Take-It-Back Network provides technical assistance to its members on how to properly collect, package, and transport equipments for recycling. It should be noted, however, that informal recycling would be unnecessary if there are effective programs in place.

Table 1. Rural recycling challenges and issues. Programs addressing the issues are marked.

Program	Loca	Challenges and Issues			
		Landfill com	Low partic	High tran	"Info
Netherlands Association for Disposal of "Metalectro" Products (NVMP)	Nethe	✓	✓	✓	
ICT-Milieu	Nethe	✓	✓	✓	
Swiss Association for Information, Communication & Organisational	Switze	✓	✓		
Specified Home Appliance Recycling (SHAR)	Japan			✓	
Hewlett-Packard Mail-back	Unit				
NxtCycle Shared Responsibility Program (SRP)	United		✓		
Hewlett-Packard - Office Depot Partnership	United		✓		
Gateway Trade-in	United		✓		
Advanced Recovery Fee	Calif		✓		
Cost-Internalization	Mai	✓	✓	✓	
Franklin County - Basin Disposal Event	Frankli				
Computer Recycling and Marketing	Clark		✓		
Collection Event	Dougl	✓			
Take-It-Back Network	KingC	✓			✓

Transfer Stations Drop Box	Snoho	✓			
Curbside Collection	Kirkl	✓	✓		
Hewlett-Packard - Starbucks - Best Buy Partnership	Seattle,	✓	✓		
Best Buy Event	Tukwila	✓			

B. Urban Recycling

Volume and Operational Capacity

Urban areas face problems that come with serving a large population. Businesses and residents turn in large volume of equipment, especially during free collections. If the volume of products received exceeds the capacity of the event operators, a project may go over budget and experience traffic build-up, labor shortage, and lack of storage room. Controlling the volume, therefore, becomes critical[9].

There are different ways for managing the volume. Ongoing collections prevent a rush of incoming materials. Because collection is done "continuously", residents are not in a hurry to turn in equipments; there will be a steady, manageable flow of materials at all times. Restrictions can also be placed on the number of items accepted. If priced properly, end-of-life (EOL) fees can keep the volume down while generating revenues. Some of the solutions are simple:

- The Netherlands have one-to-one, old-for-new return of equipments at retail stores.
- Government in Switzerland, Japan, California, and Maine all implement ongoing collection.
- Hewlett-Packard and Gateway run ongoing manufacturer programs. Residents and businesses are able to choose their own pick-up time and location through a mail-back system.
- NxtCycle subsidized end-of-life fees may limit the number of materials received.
- Hewlett-Packard and Office Depot event only take one PC-monitor-printer system per customer a day.
- King County Take-It-Back Network and the City of Kirkland curbside electronics collection program are provide on-call, ongoing collection.
- Clark County Computer Recycling and Marketing established permanent sites and schedule for ongoing collection.
- Snohomish County established permanent electronics collection at its transfer stations.
- Franklin, Douglas and Chelan County have used end-of-life fees to finance the events and limit the number of participating businesses.
- Best Buy sets end-of-fees to defray recycling cost, which may help lower the number of participant vehicles in the parking lot.

Labor Intensity and Costs

With more materials coming in, collection can be labor intensive. Staff is needed to unload, sort, package, and store materials in preparation for shipping. At one-time events, more staff must be present to monitor activities and control traffic. Some of the tasks require staff members to be well-trained.

Ongoing collection, with materials "trickling" in, reduces the need for large staffs. One-time events may have sponsors, such as retailers, who provide labor and in-kind support. Partnership with entities like repair shops, refurbishers, government, and manufacturers can bring in more trained staff. Help may be solicited from volunteers and non-profit organizations. Using prison

[9] "Good Guys Electronics Take-back Pilot Project", Northwest Product Stewardship Council, Feb 2005.

labor has benefits for workers and communities as well as draw backs in loosing jobs to low paid or no pay workers.

There are a number of strategies for dealing with labor demands:

- Ongoing collection programs reduce the number of staff required and other associated costs such as training as has been demonstrated in The Netherlands, Switzerland, Japan, and Maine
- California pays established rates to collectors and recyclers offering ongoing services and pay their own staffing.
- Hewlett-Packard, Office Depot, Best Buy, and Starbucks have their own employees work in the collection, transport, and recycling events.
- Participants in the King County Take It Back network are existing businesses that have integrated the services into their regular operations.
- Clark County Computer Recycling and Marketing program uses the Work Center prison labor to sort and dismantle equipments. Students at Clark College and a non-profit organization, Free Geek, refurbish the computers. The students transport the equipments through a "Van Training" program.
- Kirkland curbside recyclables collection program has added electronic products into the materials collected, using the same drivers and equipment that collect traditional recyclable materials.

Sorting for Reuse

Communities that support both recycling and reuse face another challenge. In order to be reusable, the equipments must be functional and up-to-date. Most residents, when questioned, would reply that their equipment still functions even if that is not necessarily the case. Checking each item for reusability is time-consuming and can slow down collection[10].

Rather than being checked on-site, equipments can be transported elsewhere for evaluation. This may be done at consolidation points or recycling facilities. Some recyclers screen materials and set aside a percentage for reuse.

- The Netherlands ship materials to Mirec and Coolrec. These recyclers are responsible for sorting out reusable items.
- Maine uses its consolidation facilities to count brands and separate reusable materials.
- King County Take-It-Back Network has members who specialize in refurbishing, repairing, and/or reselling the equipments.
- Clark County Computer Recycling and Marketing sends all materials collect to a Jail Work Center to separate functional units for refurbishing.

In general, ongoing collection seems to solve most of the problems associated with urban recycling. The large number of participants can be overwhelming, especially with the rapidly increasing population. Having a permanent program in place will keep systems from being inundated with products and reduce the overall cost of operation, particularly in relation to labor costs.

[10] Homa, John, "Used Computer Recycling Collection Events," Knox County, June 2004.

Table 2. Urban recycling challenges and issues. Programs addressing the issues are marked.

Program	Location	Challenges and Issues		
		Volume Control	Higher Staffing	Sorting for Reuse
Netherlands Association for Disposal	Netherlands	✓	✓	✓
ICT-Milieu	Netherlands	✓	✓	
Swiss Association for the	Switzerland	✓	✓	
Specified Home Recycling	Japan	✓	✓	
Hewlett-Packard Mail Back	United States	✓	✓	
NxtCycle Shared Responsibili	United States	✓		
Hewlett-Packard - Office	United States	✓	✓	
Gateway Trade-in	United States	✓		
Advanced Recovery Fee	California	✓	✓	
Cost-Internalization	Maine	✓		✓
Take-It-Back Network	King County, WA	✓	✓	✓
Computer Recycling and	Clark County, WA	✓	✓	
Collection Event	Douglas and Chelan Counties,	✓		
Franklin County - Basin	Franklin County, WA	✓		
Transfer Stations Drop Box	Snohomish County, WA	✓	✓	
Curbside Collection	Kirkland, WA	✓	✓	
Hewlett-Packard - Starbucks -	Seattle, WA		✓	
Best Buy Event	Tukwila, WA	✓	✓	

Issue 12: Impacts on local governments, nonprofit organizations, waste haulers, and other stakeholders - Reference: Section 1 (2) d.

Currently, the responsibility for planning for and managing municipal solid waste falls to local governments. Each county, and some cities, must write a solid waste management plan describing the systems that will be employed to manage waste generated within their jurisdiction, twenty years into the future. A system to provided recycling services within the jurisdiction must be described.

New waste streams pose new challenges to local governments in these planning and management processes. When recycling infrastructure is created, a capital investment is made to process that materials based on the known waste stream. When the waste composition changes, as it has in relation to the increasing volume of electronic products being disposed, the need to modify the processing systems and upgrade capital facilities becomes necessary. These upgrades are most often paid by the citizen rate payers. Pressure to keep costs low, while continuing to respond to the demands for increased services places both local governments and their contracted service providers (waste haulers) in difficult positions.

The use of computers and their rapid technological improvements have created a situation where their functional life is short. Even though they continue to function mechanically, they no longer serve the needs of users as new equipment is introduced that makes the older equipment obsolete.

Because it still “runs” consumers believe that the equipment still has value. Many consumers have turned to charities to donate older equipment. Charities have found themselves saddled with equipment that can not be sold to consumers and can not be disposed of or recycled without significant cost.

Many computers that are considered surplus from government agencies are given to school districts around the state. The functional life of these units is short, as most of the useful life was used by the government agencies. School districts, especially districts in lower income areas of the state, are recipients of these machines. They end up being responsible for end of life disposal. Many are returned to General Administration, Surplus Properties. Surplus Properties contracts for disposal or recycling or auctions these items in volume to the highest bidders.

Overall, the responsibility for disposal of end of life electronics falls upon the last owner, or recipient. Along with the responsibility comes the expense. Often times the last holder of the product is the least likely to be able to afford the disposal costs.

Future Considerations

Study of Additional Electronic Products

An evaluation of the need to include additional electronics and electronic equipment should be undertaken. Products to consider include, but not limited to:

- Cellular telephones;

- Home entertainment equipment, such as video cassette recorders and players, digital video disk players, compact disk players, speakers, amplifiers, tuners, portable players, etc.;
- Small kitchen appliances such as microwave ovens, toaster ovens, blenders and other kitchen convenience devises;
- Consumer gaming equipment, electric and electronic toys;
- Electronic and electric tools, such as hand drills, table saws, welders, etc.;
- Anticipated future electronic, equipment, products and devises that may be developed over time; and
- Batteries and other power providing devises used to provide energy to operate any of the above.

Full cooperation from the manufacturing and business communities, non-governmental organizations and local governments with the department in carrying out this study is necessary and anticipated.

[i] **RCW 43.21C.020 Legislative recognitions -- Declaration -- Responsibility.**
(1) … (c) fulfill the social, economic, and other requirements of present and future generations of Washington citizens.
(2)… it is the continuing responsibility of the state of Washington … to improve and coordinate plans, functions, programs, and resources to the end that the state and its citizens may:
(g) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

[ii] **RCW 70.95.010 Legislative finding -- Priorities -- Goals.**

8) The following priorities for the collection, handling, and management of solid waste are necessary and should be followed in descending order as applicable:
(a) Waste reduction;
(b) Recycling, with source separation of recyclable materials as the preferred method;
(c) Energy recovery, incineration, or landfill of separated waste;
(d) Energy recovery, incineration, or landfill of mixed municipal solid wastes.
(9) It is the state's goal to achieve a fifty percent recycling rate by 2007.
[iii] RCW 43.21H.020 State and local authorities to insure that economic values be given appropriate consideration in rule-making process.

All state agencies and local government entities with rule-making authority under state law or local ordinance shall adopt methods and procedures which will insure that economic values will be given appropriate consideration in the rule-making process along with environmental, social, health, and safety considerations.
[1975-'76 2nd ex.s. c 117 § 2.]

[iv] Clean Production Action, Extended Producer Responsibility, http://www.cleanproduction.org/AAbase/default.htm EPR Home.
INDUSTRY REACTIONS TO Extended Producer Responsibility (EPR)

"We see it as an opportunity in the U.S. where we are getting into the recycling business. We're presently considering the European market situation. And there will be other major changes. Future transportation may not involve owning a car. Instead, you may own the right to transportation. We will make vehicles and either lease or loan them to you. We'll end up owning a vehicle at the end-of-life and have to dispose of it. We will treat it as a technical nutrient, making it into a car or truck again. We're getting ourselves ready for the day when this is truly cradle-to-cradle. We're not fighting it, we're embracing it." --Statement by Bill Ford, CEO of Ford Motor Company, 1999—

Many companies, particularly multi-national affiliates who reside in Europe, are supporting "Extended Producer Responsibility" as they see it as an opportunity to be more competitive and economically efficient with the resources they use in products. Major electronic manufacturers in Europe, such as Apple Europe, Hewlett Packard, Sony Europe, and Intel and environmental NGOs released joint statements of support for the Waste from Electrical and Electronic Equipment Directive (WEEE).

WEEE mandates that individual electronic manufacturers take back their products at the end-of-life as well as design out harmful materials and meet recycling/reuse targets. Manufacturers in Europe not only supported the EPR legislation, but also advocated for mandated individual responsibility, which means corporations have to take back their products independently. Individual responsibility is critical to helping manufacturers redesign products as the alternative system whereby companies fund a third party to collectively take back products does not reward companies who improve the environmental design of their products.

"Individual responsibility encourages competition in the environmental performance and rewards improvements. Collective responsibility makes environmental improvements pointless and rewards the irresponsible and the lazy." --Electrolux, the world's largest producer of kitchen appliances--

Joint Press Statement
of Industry, Consumer and Environmental Organisations
on Producer Responsibility in the
Waste Electrical and Electronic Equipment (WEEE) Directive

This Statement refers to the responsibility of financing the management of WEEE for products sold in the future, and not the organisation of recycling systems. As regards all products sold in the past (historical waste), both the Council and the European Parliament have proposed that producers shall share the cost of recycling.

The European Parliament has concluded its First Reading and the Council has adopted its Common Position on the proposed WEEE directive. The Second Reading of the European Parliament will be completed by April 2002.

One of the objectives of introducing producer responsibility is to create incentives for producers to improve the design of their products with a view to enhancing their environmental performance. We support this ambition.

The European Parliament has made a constructive proposal that would secure this objective by establishing a strong producer responsibility, whereas the Council's Common Position fails to create the necessary incentives.

In addition, through its Article 7.4 the Council has proposed that existing producers should always finance the recycling of products from producers that disappear, or where the producer cannot be identified. Our opinion is that this stands on weak legal grounds. It would also become a dangerous incentive for free-riding, meaning short-sighted actors (producer = importer and/or manufacturer) would be able to place products on the market without addressing how these products should be recycled in the future.

Instead, the Parliament has proposed that each producer would be required to provide appropriate guarantees for the management of WEEE. This establishes the necessary legal instrument for proper enforcement and addresses the issue of free-riders. This is essential to avoid placing unjustified burdens on tax-payers and consumers.

For the second reading, we urge the Council, the European Parliament and the Commission to:

⇒ **Support the proposal of the European Parliament for financing on a individual basis and the need to provide appropriate guarantees for the financing of the management of WEEE (and the section of Article 3 defining individual financing)**

⇒ **Reject the proposal of the Council regarding free-riders (Article 7.4 of Council Common Position)**

AeA (American Electronics Association) Europe

Association of Netherlands ICT Sector (ICT Milieu)

Bellona Europa – Environmental NGO

BEUC – The European Consumers' Organisation

Confederation of Swedish Enterprise

European Environmental Bureau

Japan Business Council in Europe

SRI – The Swedish Recycling Industries' Association

Swiss Association of Information, Communication and Organisation Technology

VI – Association of Swedish Engineering Industries

WWF-UK (Part of the global environmental network)

Zentralverband Elektrotechnik- und Elektronikindustrie e.V (ZVEI) – The German Electrical And Electronic Manufacturers' Association

AB Electrolux
Agilent Technologies
Apple Europe
Fujitsu Siemens Computers GmbH
Hewlett-Packard
ICL plc
IKEA Service Center S.A
Intel Corporation
Länsförsäkringar Insurance Group
Lucent Technologies
Nokia
Oekopol Institute, Hamburg
Sanyo
Siemens AG
Sony
Sun Microsystems.
The Gillette Group Europe/ Braun